In the Claims:

1. *(currently amended)* A method executed by a digital signal processing system of generating a signature associated with a known audio signal, the signature comprised of a set of numeric values of at least one element and corresponding to at least one time frame of the signal, such known audio signal being identified by an identification index and such time frame being identified by a time frame index, comprising:

Calculating for at least one time frame of the audio signal a pre-determined number of spectral magnitude values grouped in at least one frequency band of pre-determined width;

Calculating for each frequency band a numeric value that is equal to a pre-determined function of one or more of the calculated spectral magnitude values grouped within the frequency band where the pre-determined function is comprised of either: (i) a linear combination, (ii) a quadratic function, (iii) a centroid, (iv) a variance, or (v) an n-th order moment, where n is a pre-determined number;

Storing the calculated numeric values in a computer database with a reference to their corresponding time frame index and their corresponding identification index.

2. *(cancelled)*

3. *(currently amended)* The method according to Claim [[2]] 1 further comprising dividing the function result by the pre-determined number of spectral magnitude values in the corresponding frequency band.

4. *(previously presented)* The method according to Claim 1 where the function is a linear combination where the coefficient of each term of the linear combination is substantially equal to the ordinal index of the spectral magnitude value within the frequency band divided by a predetermined constant.

5. *(previously presented)* The method according to Claim 1 where the number of predetermined frequency bands is between 10 and 100.

6. *(previously presented)* The method according to Claim 1 where the frequency bands occupy a range of above approximately 0 Hz and approximately equal to or below 4000 Hz.

7. *(previously presented)* The method according to Claim 4 where the predetermined constant is substantially equal to the sum of the spectral magnitude values in the corresponding frequency band.

8. *(previously presented)* The method according to Claim 7 further comprising dividing the function result by the pre-determined number of spectral magnitude values in the corresponding frequency band.

9. *(previously presented)* The method according to Claim 1 where the width of a frequency band is set to be substantially larger than the magnitude of the frequency shift that results from a predetermined maximum amount of variation in the playback speed of

the known signal, such shift being measured at one or both of the upper or lower boundary of the frequency band.

10. *(previously presented)* The method of Claim 9, where the upper boundary of the frequency band is substantially equal to lower boundary plus a value equal to the absolute value of the maximum relative playback speed variation, times the lower boundary, times a constant, where the constant ranges between approximately 1 and 100.

11. *(previously presented)* The method of Claim 10, where the constant is between approximately 10 and 50.

12. *(previously presented)* The method according to Claim 9, where for each frequency band, the upper boundary of the frequency band is substantially equal to the value of the lower boundary of the frequency band times the sum of one plus a pre-determined value.

13. *(previously presented)* The method according to Claim 10 where the pre-determined value is between the values of approximately 0 and approximately 10.

14. *(currently amended)* A method executed by a signal processing system for determining whether a portion of a detected audio signal of a pre-determined number of sequential time frame duration is substantially the same signal as a portion of at least one known signal out of a plurality of known audio signals, each portion of the plurality of

known signals comprised of a plurality of sequential time frame duration and each time frame of the known audio signal having an identification index and time frame index, comprising:

Calculating for at least one of the time frames of at least one of the known audio signals a first signature comprised of a set of numbers derived from a pre-determined number of spectral magnitude values detected during the time frame;

Storing in a computer database each first signature with a reference to its corresponding signal identification index and a reference to the approximate location in time of the time frame from substantially the beginning of said known signal;

Calculating for at least one of the time frames of the detected signal a second signature comprised of a set of numbers derived from a pre-determined number of spectral magnitude values detected during the time frame;

Selecting from the stored set of first signatures those first signatures that in relation to the second signatures meet a predetermined matching criteria, s

Applying a sequencing test to the time indices associated with the set of matching signatures.~~, where such selection occurs as a result of the arrival of a new time frame in the detected signal~~.

15. *(previously presented)* The method of Claim 14 where the first signature and second signature is calculated and stored using one of the methods of Claim 1, Claim 2, Claim 5, Claim 7, Claim 9, Claim 11.

16. *(previously presented)* The method of Claim 14 where the predetermined matching criteria comprises:

Calculating a set of absolute values of the differences between each ordinal member of the set of numbers comprising the first signature and each such member's corresponding ordinal member of the set of numbers comprising the second signature;

Calculating a sum of the absolute values; and

Determining whether the sum produces a value less than a pre-determined value.

17. *(previously presented)* The method of Claim 14 where the predetermined matching criteria comprises:

Calculating a set of absolute values of the difference between each ordinal member of the set of numbers comprising the first signature and each such member's corresponding ordinal member of the set of numbers comprising the second signature;

Calculating a sum of the set of absolute values;

Determining whether the sum is the minimum sum for all the first signatures tested.

18. *(previously presented)* The method of Claim 14 where the predetermined matching criteria comprises:

Calculating an error value using one of the group of: (i) the approximate vector distance from the first signature to the second signature; (ii) the approximate L-1 norm between the first signature and the second signature; (iii) the approximate maximum difference between any member in the first signature and its corresponding ordinal

member in the second signature; (iv) the approximate minimum difference between any member in the first signature and its corresponding ordinal member in the second signature; (v) the approximate average difference between all of the members in the first signature and their corresponding members in the second signature.

19. *(previously presented)* The method of Claim 14 further comprising the steps:

Determining whether the number of first signatures that meet the predetermined matching criteria and have the same identification index is equal to or greater than a number between and including K+1 and 2K+1, where K is evaluated such that 2K+1 is substantially equal to the predetermined number of time frames.

20. *(previously presented)* The method of Claim 14 where the matching criteria comprises:

Determining whether the values of the time frame indices corresponding to matching first signatures with the same identification index increase substantially monotonically in relation to the values of the time frame indices of the matching time frames of the detected signal.

21. *(previously presented)* The method of Claim 14 where the matching criteria comprises:

Determining whether the values of the time frame indices corresponding to matching first signatures with the same identification index are substantially linearly correlated with the values of the time frame indices of the matching time frames of the

detected signal.

22. *(previously presented)* The method of Claim 14 where the matching criteria comprises:

Calculating an approximate regression analysis between the values of the time frame indices corresponding to matching first signatures with the same identification index and the values of the time frame indices of the matching time frames of the detected signal.

23. *(currently amended)* The method of Claim [[22]] <u>21</u> where the determination is comprised of a test whether the <u>linear</u> correlation coefficient is greater than or equal to approximately .5.

24. *(currently amended)* The method of Claim [[23]] <u>21</u> where the determination is comprised of a test whether the linear slope is within a range from and including approximately 2 to and including approximately 6.

25. *(previously presented)* The method of Claim 14 where the time frame indices of the detected signal and a matching known signal are periodically tracked to confirm that in a sequence of at least two time frames the time frame indices of the detected signal increase approximately in correspondence with the increase in the time frame indices of the matching known signal.

26. *(currently amended)* A method executed by an audio signal processing system for determining whether a portion of a detected audio signal of a pre-determined number of sequential time frame duration is substantially the same signal as a portion of at least one known audio signal out of a plurality of a known signals, each portion of the plurality of known signals comprised of a plurality of sequential time frame duration and each time frame of the known signal having an identification index and a time frame index, comprising:

Calculating for at least one of the time frames of at least one of the known signals a first signature comprised of a set of numbers derived from a pre-determined number of frequency magnitude values detected during the time frame;

Storing in a computer database each first signature with a reference to its corresponding known identification index and a reference to the approximate location in time of the time frame from substantially the beginning of said known signal;

Calculating for at least one of the time frames of the detected signal a second signature comprised of a set of numbers derived from a pre-determined number of frequency magnitude values detected during the time frame;

Selecting from the stored set of first signatures those first signatures that ~~together with the second signature~~ meet a predetermined matching criteria with the second signatures;

Storing in at least one data structure and the time frame [[index]] indices and the identification [[index]] indices corresponding to the matching first signatures;

Deleting from the data structures those time frame indices and corresponding identification indices where fewer than approximately K+1 enters in the list have the

same identification index, where K is calculated such that 2K+1 is equal approximately to the predetermined number of time frames constituting the portion of the detected signal;

Deleting from the list those time frame indices and identification indices where the time frame indices of the first signature are not confirmed to increase substantially in synchrony with the time frame indic[i]es of the detected signal.

27. *(currently amended)* A method executed by a <u>audio </u>signal processing system of searching a database comprised of a set of at least n first signatures with corresponding identification indices and time frame indices, where each first signature represents the frequency components of a known <u>audio </u>signal during the time frame, the search looking for all first signatures that ~~together with a second signature~~ meet[[s]] a pre-determined matching criteria <u>with a second signature</u>, where the second signature represents the frequency components of a detected <u>audio </u>signal during a time frame, comprising:

Storing in computer memory a first data array comprised of all of the first signatures, whereby the n-th row in the first data array is the set of members of the n-th first signature;

For at least one column in the first data array, sorting within the computer memory, the elements of the column in either ascending or descending order;

Storing in computer memory an additional data array where one element in the second data array corresponds to an element in the one column of the first data array, and the value of the one element in the second data array cross-indexes to where the corresponding element in the first data array originated prior to the sorting step;

Applying a search using the second signature to find best match between the second signature and the rows of the first data array.

Recovering the identification index and time frame index of any matching first signature by using the cross-index of the second data array and applying it in the matching row.

28. *(previously presented)* The method of Claim 27 where, the search algorithm is one of: binary search, B Tree, linear search, heuristic tree searching, depth first search, breadth first search.

29. *(currently amended)* A method executed by an <u>audio</u> signal processing system of searching a database comprised of at least one first signature representing a <u>first</u> <u>audio</u> signal using a query comprised of a second signature where the first and second signatures are both sets of a predetermined number of elements, each element a number, comprising:

For each first signature, applying a predetermined calculation to calculate a first integer as a function of a subset of elements comprising each first signature<u> said elements derived from spectral magnitudes detected in the first audio signal</u>;

Storing in a computer memory location corresponding to the value of the first integer a reference to the corresponding first signature used in calculating the first signature;

Calculating a second integer using the same predetermined calculation applied to the corresponding subset of the second signature said elements derived from spectral magnitudes detected in a second audio signal;

Selecting memory locations corresponding to integer values within a predetermined error function from the second integer;

Determining any first signatures and their identification index and time frame index corresponding to the selected memory locations.

30. *(previously presented)* The method of Claim 29 where the predetermined calculation is a linear combination of at least two elements of the signature.

31. *(previously presented)* The method of Claim 29 where the subset has less than five elements of the first signatures.

32. *(cancelled)*

33. *(previously presented)* The method of Claim 14 where the signal is comprised of programming of unknown identity that has not been found to match any portion of any known signal further comprised of time frames with corresponding signatures comprising:

Creating an arbitrary identifier with an identification index;

Assigning the identification index to those signatures derived from the signal;

Replacing the arbitrary identifier with a correct identification when the unknown signal is identified.

34. *(previously presented)* The method of Claim 33 further comprising replacing the arbitrary identification index in the database with a pre-existing identification index that references valid identification data identifying the signal.

35. *(previously presented)* A machine comprising a central processing unit, a digital data transceiver device and a data storage device comprised of any machine readable media, where the machine readable media contains a computer program that when executed by the machine, performs any one of the methods of Claims 1-14 or 16-34.

36. *(previously presented)* A machine readable media of any type, which contains data that is a computer program that when executed by a computer, performs any one of the methods of Claims 1-14 or 16-34.

37. (*new*) The method of Claim 1 where the width of each frequency band contains a different number of frequency magnitude values.

38. (*new*) The method of Claim 14 where the selecting step is comprised of:

Performing a range search of the stored set of first signatures.

39. (*new*) The method of Claim 39 further comprising:

Pre-sorting the stored first signatures;

Maintaining an index table that maps the inverse of the sorting.

40. (*new*) The method of Claim 14 where the selecting step is comprised of transforming the stored set of first signatures into a one-dimensional space.